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A NEW SPECIES AND NEW RECORD OF BITING MIDGES OF THE GENUS *DASYHELEA* KIEFFER (DIPTERA: CERATOPOGONIDAE) FROM MORELOS AND JALISCO, MEXICO

HERON HUERTA AND WILLIAM L. GROGAN, JR.

(HH) Laboratory of Entomology, InDRE (=ISET), Carpio 470, Col. St. Tomas, México D. F. 11340, Mexico (e-mail: cerato_2000@yahoo.com); (WLG) Department of Biological Sciences, Salisbury University, Salisbury, MD 21801, U.S.A. (e-mail: wlgrogan@salisbury.edu)

Abstract.—***Dasyhelea azteca* Huerta and Grogan, new species**, is described and illustrated from adults of both sexes from southwestern Morelos and Jalisco, Mexico. This new species is a member of the *Dasyhelea grisea* group and is compared with similar, related congeners. *Dasyhelea mutabilis* (Coquillett) is recorded for the first time from Mexico.

Resumen.—***Dasyhelea azteca* Huerta y Grogan, n. sp.**, es descrita e ilustrada con base en adultos de ambos sexos procedentes del sureste de Morelos y Jalisco, México. Esta nueva especie es un miembro del grupo *Dasyhelea grisea*, la cual es comparada y relacionada con sus similares congéneres. *Dasyhelea mutabilis* (Coquillett) es registrada por primera vez para México.

Key Words: Diptera, Ceratopogonidae, *Dasyhelea*, biting midge, Mexico, Morelos, Jalisco, new species

Biting midges of the genus *Dasyhelea* Kieffer are common inhabitants of a variety of lentic habitats in all regions of the world except Antarctica (Wirth 1978). This large, complex group has received some modern systematic attention for a few geographical areas, but undoubtedly many species await discovery and formal description. At present, 489 extant species are known, as well as 14 fossil species (Borkent and Wirth 1997; Borkent personal communication). The region south of the United States contains 64 species, 15 of which have been recorded from Mexico (Borkent and Spinelli 2000). Wirth (1978) described four new species from the Gulf of California, Baja California, Mexico and provided the first record of *D. calvescens* Macfie from Mexico. More recently, Huerta and Ibáñez-Bernal (1999) described a new Mexican species from San Luis Potosi of unknown species group and Spinelli and Rodriguez (1999) described another new, wide ranging species (Mexico to Argentina).

We examined a small series of an undescribed species of *Dasyhelea* that was recently collected by HH in the southwestern region of Morelos, Mexico, plus an additional specimen collected in Jalisco, Mexico by A. Rodríguez. These midges were slide mounted in Canada balsam using the technique described by Borkent and Bissett (1990) and are herein described and illustrated as a new

species. We employ the modern terminology of Ceratopogonidae in Downes and Wirth (1981) with recent modifications to wing veins and cells as proposed by Szadziewski (1996) which are tabulated in Spinelli and Borkent (2004). See Waugh and Wirth (1976) for descriptions of the species and species groups of *Dasyhelea* in North America.

Dasyhelea azteca Huerta and Grogan, new species

(Figs. 1–18)

Diagnosis.—A typical species of the *Dasyhelea grisea* group with a broadly elliptical frontal sclerite with long, slender ventral projection, that is distinguished from all other New World species by the following combination of characters. Female with abdominal tergites dark brown; hind femur with broad patch of dark pigment on mid-portion; palpal segment 3 with capitate sensilla on both lateral sides; and a single pyriform spermatheca that is bent distally and with a moderately long, very narrow, straight neck. Male sternite 9 produced slightly posteriorly with fine spicules on posterior margin and aedeagus with shallow basal arch and distal portions of unequal length.

Female.—Coloration of body generally dark brown, with darker pigment on scutellum, halter, hind femur, abdominal tergites.

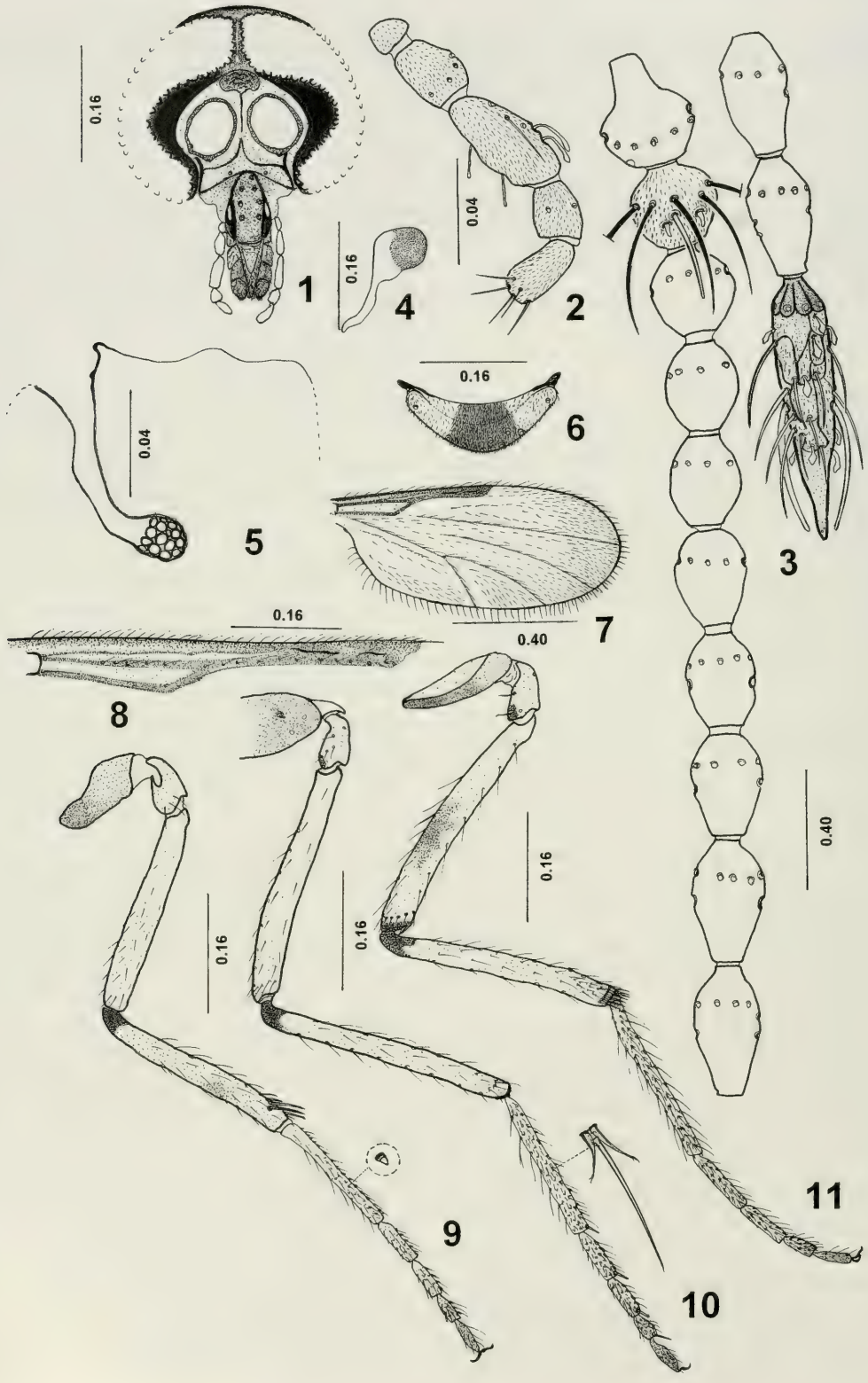
Head: Dark brown. Eyes (Fig. 1) broadly contiguous, with fine pubescence; frontal sclerite broadly elliptical, with long, slender ventral projection. Antenna flagellum of allotype (Fig. 3) with lengths of flagellomeres in μm: 42-30-30-30-30-32-32-35-42-42-42-42-80; total flagellum length 0.509 mm; antennal ratio 0.88 (0.81–0.98, n = 4); flagellomeres with distinct reticulations as illustrated on flagellomere 13. Mouthparts short; frontoclypeus with 7-9 setae (Fig. 1); palpus (Fig. 2) with lengths of segments in μm: 10-25-45-22-30; segment 3 with sparse scattered capitate sensilla on both lateral sides; palpal ratio 2.07 (1.83–2.50, n = 4).

Thorax: Scutum dark brown, humeral areas brown; scutellum (Fig. 6) with dark brown band on mid-portion; anepisternum (Fig. 5) with small, round, reticulate area. Legs (Figs. 9–11) pale, femoro-tibial joints darker, hind femur (Fig. 11) with broad patch of dark pigment on mid-portion; tibiae with dark brown basal band, fore tibia (Fig. 9) with small faint spot on midlength; hind tibial comb with 7 setae; hind tarsal ratio 2.8 (2.6–3.0, n = 4); tarsomeres 1–4 pale, tarsomeres 5 brownish. Wing (Figs. 7–8) membrane hyaline, covered with dense macrotrichia on distal 1/5 and posterior margin, proximal 4/5 with less dense macrotrichia; radial cells (Fig. 8) reduced to short, narrow sutures; wing length 1.00 (0.93–1.07 mm, n = 4), breadth 0.47 (0.38–0.53 mm, n = 4); costal ratio 0.46 (0.44–0.54, n = 4). Halter (Fig. 4) stem pale; knob infuscated on distal 2/3.

Abdomen: Dark brown. Tergites (Fig. 12) dark brown with distinctive pattern of small, clear areas arranged in semicircles; sternite 8 (Fig. 13) with sinuous sclerotization on posterior margin and underlying sclerotized hastate marking; sternite 9 (Fig. 13) similar to other species of the *grisea* group with sinuate basal arms on each side of gonopore; sternite 10 with single pair of large setae. Spermatheca (Fig. 14) heavily sclerotized with surface punctations, pyriform in shape with bent distal portion that is more elongate in some specimens, neck straight, moderately long, very narrow, total length including neck 0.070 (0.065–0.080 mm, n = 4), breadth 0.04 (0.040–0.051 mm, n = 4).

Male.—Size and overall coloration similar to female with the following notable sexual differences.

Head: Antennal flagellum with flagel-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lomeres 11–13 elongated (Fig. 15), 13 moderately slender, tapering distally to slender pointed tip; total flagellum length 0.66 (0.62–0.71 mm, n = 3); antennal ratio 0.88 (0.87–0.91, n = 3). Palpus with lengths of segments in μm: 15-32-47-25-32; palpal ratio 2.6 (2.5–2.7, n = 3).

Thorax: Legs with more strikingly marked dark pattern; hind femur with patch of dark pigment on mid-portion (on holotype, a solid band); hind tarsal ratio 2.7 (2.7–2.8, n = 3). Wing length 1.06 (0.97–1.13 mm, n = 3), breadth 0.35 (0.32–0.38 mm, n = 3); costal ratio 0.48 (0.46–0.49, n = 3). Genitalia (Figs. 16–18). Sternite 9 moderately long, posterior margin produced slightly with fine spicules; tergite 9 longer than broad, tapering gradually distally to slightly curved posterior margin, apicolateral process elongate, slender, with apical seta; cercus small, pilose. Gonocoxite 1.4× longer than broad, with short, mediobasal tubercle; gonostylus curved, tapering slightly distally, pubescent except for apical 1/4, apex truncate. Parameres (Fig. 16) divided; basal arms curved, expanded distally into club shape; median process elongated, fused to right basal arm, posterior portion slightly curved distally, apex tapering to sharp, slightly recurved point. Aedeagus (Fig. 17) heavily sclerotized; basal arm, slender, recurved 60°; anterior margin nearly straight; distal portion bearing pair of stout, posteriorly directed processes that are unequal in length, right process distinctly shorter than left one.

Etymology.—The specific epithet *azteca*, refers to this species distribution in Aztec territory and is from the Nahuatl language. The term "Nahuatl" refers to all of the native American languages indigenous to central Mexico.

Type material.—Holotype ♂, allotype ♀, 2 ♂, 3 ♀ paratypes labeled: MEXICO, Morelos, Municipio Tepalcingo, Huitchila, Locality "Los Sauces"; Malaise trap, 23–28 Jun. 1993, forest, col. H. Huerta; 1 ♂ paratype labeled: MEXICO, Jalisco, Biology Station Chamela, 28-10-1992, trap Malaise, basin 1, sample 119, Col. A. Rodríguez. Holotype, allotype, 1 ♂, 1 ♀ paratypes in the insect collection at CAIM (InDRE); 1 ♂, 1 ♀ paratypes in the collection of the Museo de La Plata, Argentina; 1 ♂, 1 ♀ paratypes deposited in the National Museum of Natural History, Washington, DC.

Distribution.—Known only from Morelos and Jalisco, Mexico.

Discussion.—This new Mexican species is a member of the *grisea* group as defined by Waugh and Wirth (1976) in that it has an elliptical frontal sclerite with an elongate distal portion, a single pyriform spermatheca and similar shapes and configurations of its male and female genitalia. In the Nearctic Region, the male genitalia most closely resemble those of *D. grisea* (Coquillett) and *D. oppressa* Thomsen, but differ from those 2 species in several ways. This Mexican species lacks the basal hooklike processes on the mesal surface of the gonocoxite in *D. grisea*, but instead possesses a much smaller, mediobasal tubercle. The parameres are similar to those of *D. grisea*, but in that species, the bases of the parameres are usually narrowly connected. In *D. oppressa*, the median portion of the parameres is longer and the apex is folded over and ventrally directed, the basal portions of the parameres are usually not connected and

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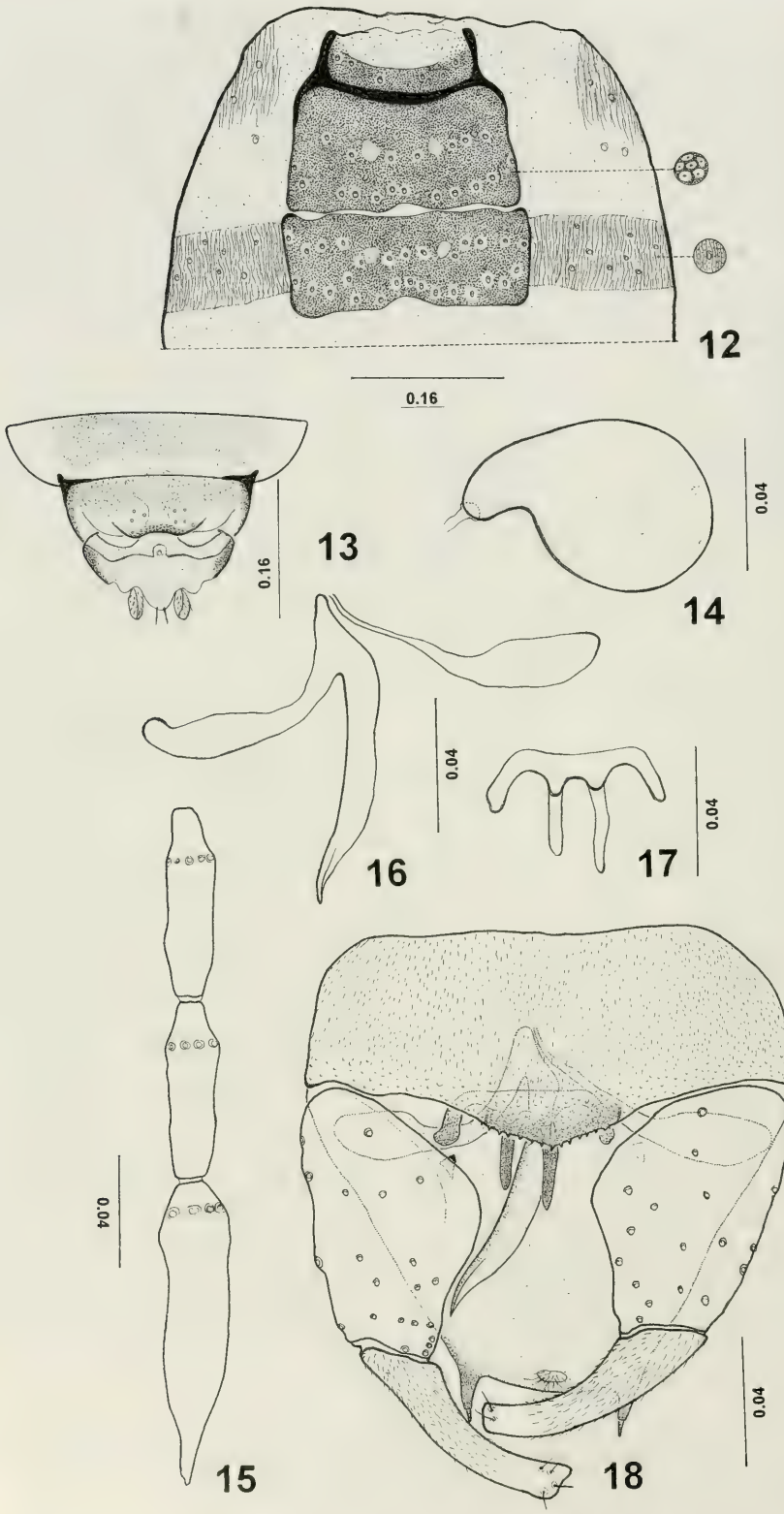
Figs. 1–11. *Dasyhelea azteca*, female. 1, Head, anterior view. 2, Right palpus. 3, Antennal flagellum. 4, Halter. 5, Anepisternum. 6, Scutellum, dorsal view. 7, Wing. 8, Anterior veins of wing. 9, Fore leg. 10, Mid leg. 11, Hind leg. Scale bars in mm.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their basal arms are recurved anteriorly. The apicolateral processes and cerci of both of these Nearctic species are of slightly different configurations than this new Mexican species. Finally, the aedeagus differs slightly from both of these species by its more slender, widely spaced, unequal length distal portions.

The female spermatheca of *D. azteca* is similar to those of *D. grisea* and *D. pollinosa* Wirth in being pyriform, but, in these two Nearctic species the distal portion is straight, not curved, and their spermathecae lack a sclerotized neck. The spermatheca of this new Mexican species is somewhat similar to those of *D. stemlerae* Waugh and Wirth and *D. pseudoincisurata* Waugh and Wirth, both of which have retort-shaped spermathecae with greatly recurved distal portions. Furthermore, the reticulate sculpturing on the flagellomeres of all North American species of *Dasyhelea* is much more extensive than in this new Mexican species.

Males of *D. griseola* Wirth, from Baja California, Mexico, Panama, and Trinidad differ from this new Mexican species by its aedeagus with equal length distal portions that bear medially directed lobes and much shorter apicolateral processes. Females of *D. griseola* differ from those of *D. azteca* by their subspherical spermatheca with a long, oblique neck, a more slender, narrower subgenital sclerotization with basolateral points and a differently shaped frontal sclerite.

In the Neotropical Region, *D. necrophila* Spinelli and Rodriguez, an Argentinean member of the *grisea* group, is similar to *D. azteca* but is even darker brown in coloration. Males of *D. necrophila* differ from this new Mexican species by their genitalia with a slightly concave posterior margin of sternite 9 that lacks spicules on the posterior margin, an aedeagus with equal length distal processes and widely divergent apicolateral processes. Females of *D. necrophila* differ from those of *D. azteca* in having a triangular ventral extension on the frontal sclerite and sternite 9 has stout lateral projections that are basal to the elongate, spear-shaped median lobe.

Dasyhelea thalestris Macfie, from Brazil has similar coloration on its hind femur, but, the male genitalia are quite different from those of *D. azteca*. Males of this Brazilian species have sternite 9 prolonged posteriorly on its midportion as a conical process, the tip of which is sclerotized and the parameres are not fused basally, are shorter and lack long distal processes.

The small, round, reticulate area present on the anepisternum of both sexes (Fig. 5) is also present in other Nearctic species of the *grisea* group (A. Borkent, personal communication) as well as members of other species groups in the Nearctic region (personal observation). What this area actually represents is unknown, but, A. Borkent (personal communication) suggests that it may be the scar where the pupal respiratory organ attached to the anterior portion of the thorax.

Dasyhelea mutabilis (Coquillett)

Ceratopogon mutabilis Coquillett 1901: 602 (male; female, District of Columbia, USA).

Culicoides mutabilis: Kieffer 1906: 54 (combination).

Pseudoculicoides mutabilis: Malloch 1915: 310 (combination).

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Figs. 12–18. *Dasyhelea azteca*, female, Figs. 12–14; male, Figs. 15–18. 12, Abdominal segments 1 and 2, dorsal aspect. 13, Terminal abdominal segments, ventral aspect. 14, Spermatheca. 15, Flagellomeres 11–13. 16, Parameres. 17, Aedeagus. 18, Genitalia. Scale bars in mm.

Dasyhelea mutabilis: Thomsen 1935: 283 (combination; in key); Wirth 1952: 157 (redescription; figs. male, female, pupa; California; distribution); Waugh and Wirth 1976: 242 (redescription; figs. male, female; distribution).

Distribution.—Nearctic: Alaska to Newfoundland, south to California and Florida; Neotropical: Galapagos Islands and Mexico.

New record.—MEXICO, Morelos, municipality Tepalcingo, Huitchila, 10 km "sobre terracería", Locality "Los Sauces"; Malaise trap, 23–28 Jun. 1993, forest, col. H. Huerta , 2 ♂, 2 ♀.

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Literature Cited

Borkent, A. and B. Bissett. 1990. A revision of the Holarctic species of *Serromyia* Meigen (Diptera: Ceratopogonidae). Systematic Entomology 15: 153–217.

Borkent, A. and G. R. Spinelli. 2000. Catalog of the new world biting midges south of the United States of America (Diptera: Ceratopogonidae). Contributions on Entomology, International 4(1): 1–107.

Borkent, A. and W. W. Wirth. 1997. World species of biting midges (Diptera: Ceratopogonidae). Bulletin of the American Museum of Natural History 233: 1–257.

Coquillett, D. W. 1901. New Diptera in the U.S. National Museum. Proceedings of the United States National Museum 23: 593–618.

Downes, J. A. and W. W. Wirth. 1981. Chapter 28, Ceratopogonidae, pp. 393–421. *In* Manual of Nearctic Diptera, Vol. 1. Agriculture Canada Research Branch Monograph No. 27, 674 pp.

Huerta, H. and S. Ibáñez-Bernal. 1999. A new species of *Dasyhelea* Kieffer (Diptera: Ceratopogonidae) and new records of biting midges from the state of San Luis Potosi, Mexico. Proceedings of the Entomological Society of Washington 101: 496–502.

Kieffer, J. J. 1906. Diptera. Fam. Chironomidae. *In* P. Wytsman ed. Genera Insectorum, Fasc. 42, 78 pp., 4 pls. Bruxelles.

Malloch, J. R. 1915. The Chironomidae, or midges, of Illinois, with particular reference to the species occurring in the Illinois River. Bulletin of the Illinois State Laboratory of Natural History 10: 275–543, 24 pls.

Spinelli, G. R. and A. Borkent. 2004. New species of Central American *Culicoides* Latreille (Diptera: Ceratopogonidae) with a synopsis of species from Costa Rica. Proceedings of the Entomological Society of Washington 106: 361–395.

Spinelli, G. R. and E. A. Rodriguez. 1999. A new species of *Dasyhelea* from Argentina described as adult, pupae and fourth instar larvae (Diptera: Ceratopogonidae). Neotropica 45: 59–62.

Szadziewski, R. 1996. Biting midges from Lower Cretaceous amber of Lebanon and Upper Cretaceous Siberian amber of Taimyr (Diptera: Ceratopogonidae). Studia Dipterologica 3: 23–86.

Thomsen, L. C. 1935. New species of New York State Ceratopogonidae. Journal of the New York Entomological Society 43: 283–297.

Waugh, W. T. and W. W. Wirth. 1976. A revision of the genus *Dasyhelea* Kieffer of the eastern United States north of Florida (Diptera: Ceratopogonidae). Annals of the Entomological Society of America 69: 219–247.

Wirth, W. W. 1952. The Heleidae of California. University of California Publications in Entomology 9: 95–266.

———. 1978. New species and records of intertidal biting midges of the genus *Dasyhelea* Kieffer from the Gulf of California (Diptera: Ceratopogonidae). Pacific Insects 18: 191–198.